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Nurturing Nests Lift These Birds to a Higher Perch

By NATALIE ANGIER

Amid all the psychosocial caterwauling these days over the relative merits of tiger mothers and helicopter dads, allow me to make a pitch for the quietly dogged parenting style of the New Caledonian crow.

New Caledonian crows are renowned for their toolmaking skills.

In the complexity, fluidity and sophistication of their tool use, their ability to manipulate and bird-handle sticks, leaves, wires, strings and any other natural or artificial object they can find into the perfect device for fishing out food, or fishing out second-, third- or higher-order tools, the crows have no peers in the nonhuman vivarium, and that includes such textbook dexterous smarties as elephants, macaques and chimpanzees.

Videos of laboratory studies with the crows have gone viral, showing the birds doing things that look practically faked. In one famous example from Oxford University, a female named Betty methodically bends a straight piece of wire against the outside of a plastic cylinder to form the shape of a hook, which she then inserts into the plastic cylinder to extract a handled plug from the bottom as deftly as one might pull a stopper from a drain. Talking-cat videos just don't stand a chance.

So how do the birds get so crafty at crafting? New reports in the journals Animal Behaviour and Learning and Behavior by researchers at the University of Auckland suggest that the formula for crow success may not be terribly different from the nostrums commonly served up to people: Let your offspring have an extended childhood in a stable and loving home; lead by example; offer positive reinforcement; be patient and persistent; indulge even a near-adult offspring by occasionally popping a fresh cockroach into its mouth; and realize that at any moment a goshawk might swoop down and put an end to the entire pedagogical program.

Jennifer C. Holzhaider, the lead author on the two new reports, said that in one year of their

three-year field study, the crows they were following gave birth to a total of eight chicks.

“We thought, yay, we’ll have eight juveniles we can watch,” she said. But the goshawks, the rats, the owls and the torrential rains took their toll, and only one of those eight chicks survived. “It’s a hard life in the jungle; that’s all there is to it,” said Dr. Holzhaider.

By studying the social structure and behavior of the crows and the details of their difficult daily lives, the researchers hope to gain new insights into the evolution of intelligence, the interplay between physical and social skillfulness, and the relative importance of each selective force in promoting the need for a big animal brain.

The researchers want to know why it is that, of the 700 or so species of crows, ravens, rooks, jays and magpies that make up the world’s generally clever panoply of corvids, the New Caledonian crow became such an outlier, an avian savant, a YouTube top of the line.

“It’s a big puzzle,” said Russell D. Gray, head of the Auckland lab. “Why them? Why is this species on a small island in the Pacific able to not just use but to manufacture a variety of tools, and in a flexible rather than a rote or programmatic way? Why are they able to do at least as well as chimpanzees on experiments of cognition that show an understanding of the physical properties of the world and an ability to generalize from one problem to the next?”

If the birds learn to avoid holes and barriers in the experimental setting of a plastic tubed box, for example, they will avoid holes and barriers in the very different conditions of a wooden table. “Knowing their social structure,” Dr. Gray said, “is one part of the jigsaw.”

New DNA studies suggest that corvids first arose at the end of the dinosaur era, roughly 65 million years ago, somewhere in the neighborhood of Australia, and radiated outward from there. The ancestors of the New Caledonian crow didn’t travel far before settling on the 220-mile-long land sprig from which the species derives its name.

The modern New Caledonian crow is funereal of bill and feather and, at an average of 12 inches in length and 12 ounces in weight, a middling sort of corvid: much smaller than a common raven, slightly more compact than the ubiquitous American crow, but beefier than a jay or a jackdaw. Brain size is another matter.

“All corvid brains are relatively big,” said Dr. Gray, “but preliminary evidence suggests that the New Caledonian brain is big even for corvids.” Moreover, the brain is preferentially enlarged, displaying impressive bulk in the avian equivalent of the cogitating forebrain, particularly

structures involved in associative learning and fine motor skills.

Their bills are also exceptional, “more like a human opposable thumb than the standard corvid beak,” said Dr. Gray.

The bills “appear specialized to hold tools,” said Anne Clark, who studies American crows at the State University of New York at Binghamton but who also has observed New Caledonian crows in the field. “When I was watching them, they seemed to grab a stick whenever they appeared unable to figure something out,” she said, rather as a mathematician has trouble solving a problem without a pencil in hand.

The birds are indefatigable toolmakers out in the field. They find just the right twigs, crack them free of the branch, and then twist the twig ends into needle-sharp hooks. They tear strips from the saw-toothed borders of Pandanus leaves, and then shape the strips into elegant barbed spears.

With their hooks and their spears they extract slugs, insects and other invertebrates from deep crevices in the ground or in trees. The birds are followers of local custom.

Through an arduous transisland survey of patterns left behind in Pandanus leaves by the edge-stripping crows, Gavin Hunt of the University of Auckland determined that toolmaking styles varied from spot to spot, and those styles remained stable over time. In sum, New Caledonian crows have their version of culture.

Being cultured is hard work. In studying the birds’ social life, Dr. Holzhaider and her colleagues confirmed previous observations that New Caledonian crows are not group-living social butterflies, as many crows and ravens are, but instead adhere to a nuclear family arrangement. Males and females pair up and stay together year-round, reaffirming their bond with charming gestures like feeding and grooming each other, sitting close enough to touch, and not even minding when their partner plays with their tools.

Young birds stay with their parents for two years or more — a very extended dependency, by bird standards — and they forage together as a family, chattering all the while. “They have this way of talking in a quiet voice, ‘Waak, waak, waak,’ that sounds really lovely,” said Dr. Holzhaider.

The juveniles need their extended apprenticeship. “They’re incredibly persistent, wildly ripping and hacking at Pandanus leaves, trying to make it work,” said Dr. Holzhaider, “but for six months or so, juveniles are no way able to make a tool.”

The parents step into the breach, offering the trainee food they have secured with their own finely honed tools. “By seeing their parents get a slug out of a tree, they learn that there’s something down there worth searching for,” she said. “That keeps them going.”

The carrot-on-stick approach: It works every time.